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Process and apparatus for checking
rod-like articles, in particular cigarettes

P a t e n t c l a i m s

1. Process for checking rod-like articles, in particular cigarettes (12), by means of at least one push rod (21) which is mounted in an axially displaceable manner in a moveable testing element (20), the or each testing element (20) being moved in the direction of the articles and the or each push rod (21) being deflected as it strikes against an article and
5 an electrically evaluable signal - actuating signal (31) - being generated as a result, **characterized in that**, upon generation of the actuating signal (31), the position of the testing element (20) is determined and the determined position is evaluated, wherein in the case of a plurality of push rods (21) for each actuating signal (31) triggered by in each case one push rod (21), the respective position of the testing element (20) is determined.
- 10 2. Process according to Claim 1, **characterized in that** the position of the testing element (20) is determined in respect of a position of a machine for packaging the articles - packaging machine (10) - in which the articles are guided and which is assigned the testing element (20).
- 15 3. Process according to Claim 2, **characterized in that** the position of the packaging machine (10) is determined in a number of counting pulses relating to a full revolution of a central spindle assigned to the packaging machine (10).

4. Process according to Claims 1, **characterized in that** an error signal is generated if the position of the testing element (20), upon generation of the actuating signal (31), is located outside predeterminable limit values (32, 33).
5. Process according to Claim 1, **characterized in that** that in each case a group of items, namely a cigarette formation, is assigned two testing elements (20) each on opposite sides and that both testing elements (20) move simultaneously.
6. Process according to Claim 5, **characterized in that** that each time a pushrod (21) of one of the two testing elements (20) contacts an article the respective position of the testing element (20) is recorded and that for opposing pushrods (21) the respectively determined positions are used to deduce information concerning the length of the articles.
7. Process according to Claim 6, **characterized in that** that the length information is compared with a predetermined or predeterminable reference value or reference value range in order to identify articles that are too long or too short – “faulty articles”.
8. Process according to Claim 1, **characterized in that**, in the case of a plurality of push rods (21), the corresponding plurality of actuating signals (31) is added and a resultant cumulative frequency curve (34, 35, 36; 42, 43, 44, 45) is checked for the value exceeding or dropping below the threshold values (37, 38, 39) in respect to the relative position of the testing element (20) when the value exceeds or drops below the threshold values (37, 38, 39), or for the duration of the rise starting from a start value (37) to a maximum value (38), and the error signal is generated in dependence on this check.
9. Process according to Claim 1, **characterized in that** the articles pass through a testing shaft (13) under the influence of gravity, and in that at least one of the articles is temporarily pressed onto a wall of the testing shaft (13) by a pressure-exerting slide (14), with the result that the articles which remain above the or each pressed-on article are located in a defined position during testing by the push rod (21) or the respective push rods (21).
10. Process according to Claim 9, **characterized in that** the flow of articles through the testing shaft (13) is temporarily interrupted by means of a blocking slide (15), which is arranged beneath the pressure-exerting slide (14), as seen in the direction of flow of the articles, and is provided for temporarily blocking the testing shaft (13), and, in dependence on the error signal, one or more ejecting elements are, namely at least one

compressed-air nozzle (22) is, activated for ejecting individual articles or all the articles located between the pressure-exerting slide (14) and blocking slide (15).

11. Process according to Claim 1, **characterized in that** a plurality of articles – cigarette formation- are located in a pocket (41), open at both sides, of a cigarette turret (40), that due to the rotation of the cigarette turret (40) the pocket (41) is placed in the region of two mutually opposing testing elements (20) located laterally to the cigarette turret (40), that the rotation of the cigarette turret (40) is stopped when the region of the testing elements (20) is reached, that the two opposing testing elements (20) move toward the cigarette formation simultaneously and at the same time the pushrods (21) of the testing elements (20) enter the open ends of the pocket (41) and are deflected upon striking one of the articles.

12. Apparatus for checking rod-like articles, in particular cigarettes (12), having at least one push rod (21) which is mounted in an axially displaceable manner in a moveable testing element (20), the or each testing element (20) being moveable in the direction of the articles and the or each push rod (21) being deflectable as it strikes against an article, such that an electrically evaluable signal - actuating signal (31) - can be generated as a result, **characterized in that** it is possible to determine the position of the testing element (20) and to store or process the determined position in reaction to the actuating signal (31), with provision being made for storing or processing the respective position of the testing element (20)

13. Apparatus according to Claim 12, **characterized in that** provision is made for storing or processing the position of the testing element (20) with respect to a position of a machine, in particular of a machine for packaging the articles - packaging machine (10) - in which the articles are guided and which is assigned the testing element (20).

14. Apparatus according Claim 13, **characterized in that** that provision is made for storing or processing the position of the packaging machine (10) in a number of counting pulses relating to a full revolution of a central spindle assigned, in particular, to the packaging machine (10).

15. Apparatus according to Claim 14, **characterized in that** provision is made for generating an error signal if the position of the testing element (20), upon generation of the actuating signal (31), is located outside predeterminable limit values (32, 33).

16. Apparatus according to Claim 12, **characterized in that** that in each case a group of articles, namely a cigarette formation, is assigned two testing elements (20) each on opposite sides and that both testing elements (20) move simultaneously.

17. Apparatus according to Claim 16, **characterized in that** a processing unit is provided for measuring the respective position of the checking unit (20) based on the impact of each pushrod (21) of one of the two opposing testing elements (20) on an article and for deducing information on the length of the article on the basis of the position determined for the opposing pushrods (21) of the opposite checking unit (20).

18. Apparatus according to Claim 17, **characterized in that** the processing unit for comparing the length information is provided with a predetermined or predeterminable reference value or reference value range in order to identify articles which are too long or too short – faulty articles.

19. Apparatus according to Claim 12, **characterized in that** a processing unit which is provided, in the case of a plurality of push rods (21), for adding the corresponding plurality of actuating signals (31) and for checking a resultant cumulative frequency curve (34, 35, 36; 42, 43, 44, 45) either for the value exceeding or dropping below threshold values (37, 38, 39) in terms of the respective position of the testing element (20) when the value exceeds or drops below the threshold values (37, 38, 39), or for the duration of the rise starting from a start value (37) to a maximum value (38).

20. Apparatus according to Claim 13, **characterized by** a testing shaft (13), through which the articles pass under the influence of gravity, and by a pressure-exerting slide (14), which is provided for pressing at least one of the articles onto a wall of the testing shaft (13), with the result that the articles which remain above the or each pressed article are located in a defined position during testing by the respective push rod (21).

21. Apparatus according to Claim 20, **characterized in that** provided in the testing shaft (13) beneath the pressure-exerting slide (14), as seen in the direction of flow of the articles, is a blocking slide (15) for temporarily blocking the testing shaft (13), and provided along a section between the pressure-exerting slide (14) and blocking slide (15) are one or more ejecting elements, in particular at least one compressed-air nozzle (22), for ejecting individual articles or all the articles located between the pressure-exerting slide (14) and blocking slide (15).
